

WHAT IS CLAIMED IS

*Sub A*

---

1. A printing apparatus for performing printing by using a printhead having a plurality of printing elements, comprising:

5 discriminating means for discriminating the number of simultaneously driven printing elements of said plurality of printing elements when printing data is printed; and

control means for controlling a driving pulse to

10 be applied to printing elements used in the printing of the printing data, on the basis of a fundamental pulse width changeably determined on the basis of driving conditions of said printhead and the number of simultaneously driven printing elements discriminated by

15 said discriminating means.

---

*Sub A cont.*

2. The apparatus according to claim 1, wherein the driving conditions include a wiring resistance, heater resistance, driving TrON resistance, and environmental temperature of said printhead.

---

20 3. The apparatus according to claim 1, wherein said control means comprises:

storage means for storing a first management table for managing the correspondence of the driving conditions with the fundamental pulse width, and a

25 second management table for managing the correspondence of the fundamental pulse width with a change amount of

Sub  
Qa

the fundamental pulse width based on the number of simultaneously driven printing elements;

first determining means for determining a fundamental pulse width corresponding to the driving

5 conditions by looking up the first management table; and

second determining means for determining a change amount of the fundamental pulse width, which corresponds to the number of simultaneously driven printing elements, by looking up the second management table, and

10 changes the fundamental pulse width determined by said first determining means by the change amount determined by said second determining means to generate a driving pulse to be applied to printing elements used in the printing of the printing data.

15 4. The apparatus according to claim 1, wherein said control means defines the fundamental pulse width by one of leading and trailing edges of a pulse signal on the basis of the driving conditions, and controls a driving pulse width of a driving pulse to be applied to printing 20 elements by the other, on the basis of the number of simultaneously driven printing elements.

25 5. The apparatus according to claim 4, wherein said control means comprises storage means for storing a third management table for managing the correspondence of rise time and fall time of the heat pulse, the driving conditions, and the fundamental pulse width, and

Sub  
a1

controls a pulse width of the driving pulse corresponding to the number of simultaneously driven printing elements and the driving conditions by looking up the third management table.

5 6. The apparatus according to claim 1, wherein said printing apparatus comprises a plurality of printheads, and

if power lines for supplying power to said printheads are independent of each other, said control  
10 means executes the control for each power line.

7. The apparatus according to claim 1, wherein said control means makes a change amount for the driving pulse, which said control means generates by changing a pulse width of the fundamental pulse when the number of  
15 simultaneously driven printing elements is not less than a predetermined value, smaller than a change amount for the driving pulse, which said control means generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing elements is  
20 less than the predetermined value.

8. The apparatus according to claim 1, wherein said control means makes a change amount for the driving pulse, which said control means generates by changing a pulse width of the fundamental pulse when the number of  
25 simultaneously driven printing elements is not more than a predetermined value, larger than a change amount for

Sub  
03

the driving pulse, which said control means generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing elements is less than the predetermined value.

5 9. The apparatus according to claim 1, wherein if the number of simultaneously driven printing elements for use in predischarge of said printhead is limited, said control means makes a pulse width of a driving pulse to be applied to printing elements used in the predischarge

10 larger than a pulse width of a driving pulse to be applied to printing elements for use in printing which uses printing elements not less than the number of simultaneously driven printing elements.

10. The apparatus according to claim 1, wherein when

15 predischarge of said printhead is to be performed, said control means applies a driving pulse having a predetermined width to printing elements used in the predischarge.

11. The apparatus according to claim 1, wherein said

20 printing element is an ink discharge unit comprising an electrothermal transducer for discharging ink by generating a bubble in the ink by heat and a discharge orifice.

12. A method of controlling a printing apparatus for

25 performing printing by using a printhead having a plurality of printing elements, comprising:

Sub  
a3

the discrimination step of discriminating the number of simultaneously driven printing elements of said plurality of printing elements when printing data is printed; and

5 the control step of controlling a driving pulse to be applied to printing elements used in the printing of the printing data, on the basis of a fundamental pulse width changeably determined on the basis of driving conditions of said printhead and the number of

10 simultaneously driven printing elements discriminated in the discrimination step.

13. The method according to claim 12, wherein the driving conditions include a wiring resistance, heater resistance, driving TrON resistance, and environmental temperature of said printhead.

14. The method according to claim 12, wherein the control step comprises:

the storage step of storing a first management table for managing the correspondence of the driving conditions with the fundamental pulse width, and a second management table for managing the correspondence of the fundamental pulse width with a change amount of the fundamental pulse width based on the number of simultaneously driven printing elements;

Sub  
a4

Sub  
Q4

the first determination step of determining a fundamental pulse width corresponding to the driving conditions by looking up the first management table; and

the second determination step of determining a change amount of the fundamental pulse, which corresponds to the number of simultaneously driven printing elements, by looking up the second management table, and

comprises changing the fundamental pulse width determined in the first determination step by the change amount determined in the second determination step to generate a driving pulse to be applied to printing elements used in the printing of the printing data.

15. The method according to claim 12, wherein, the control step comprises defining the fundamental pulse width by one of leading and trailing edges of a pulse signal on the basis of the driving conditions, and controlling a driving pulse width of a driving pulse to be applied to printing elements by the other, on the basis of the number of simultaneously driven printing elements.

16. The method according to claim 15, wherein the control step comprises the storage step of storing a third management table for managing the correspondence of rise time and fall time of the heat pulse, the driving conditions, and the fundamental pulse width, and

Sub  
a4

comprises controlling a pulse width of the driving pulse corresponding to the number of simultaneously driven printing elements and the driving conditions by looking up the third management table.

5 17. The method according to claim 12, wherein said printing apparatus comprises a plurality of printheads, and if power lines for supplying power to said printheads are independent of each other, the control 10 step comprises executing the control for each power line.

18. The method according to claim 12, wherein the control step comprises making a change amount for the driving pulse, which the control step generates by changing a pulse width of the fundamental pulse when the 15 number of simultaneously driven printing elements is not less than a predetermined value, smaller than a change amount for the driving pulse, which the control step generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing 20 elements is less than the predetermined value.

19. The method according to claim 12, wherein the control step comprises making a change amount for the driving pulse, which the control step generates by changing a pulse width of the fundamental pulse when the 25 number of simultaneously driven printing elements is not more than a predetermined value, larger than a change

Sub 3

amount for the driving pulse, which the control step generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing elements is less than the predetermined value.

5 20. The method according to claim 12, wherein if the number of simultaneously driven printing elements for use in predischarge of said printhead is limited, the control step comprises making a pulse width of a driving pulse to be applied to printing elements used in the

10 10 predischarge larger than a pulse width of a driving pulse to be applied to printing elements for use in printing which uses printing elements not less than the number of simultaneously driven printing elements.

21. The method according to claim 12, wherein when

15 15 predischarge of said printhead is to be performed, the control step comprises applying a driving pulse having a predetermined width to printing elements used in the predischarge.

22. The method according to claim 12, wherein said

20 20 printing element is an ink discharge unit comprising an electrothermal transducer for discharging ink by generating a bubble in the ink by heat and a discharge orifice.

23. A computer-readable memory storing program codes

25 25 of control of a printing apparatus for performing

Sub A6

printing by using a printhead having a plurality of printing elements, comprising:

a program code of the discrimination step of discriminating the number of simultaneously driven

5 printing elements of said plurality of printing elements when printing data is printed; and

a program code of the control step of controlling a driving pulse to be applied to printing elements used in the printing of the printing data, on the basis of a

10 fundamental pulse width changeably determined on the basis of driving conditions of said printhead and the number of simultaneously driven printing elements discriminated in the discrimination step.

24. The apparatus according to claim 1, wherein the  
15 fundamental pulse width is a fundamental pulse width selected and determined from a plurality of fundamental pulse widths.

25. The apparatus according to claim 1, wherein the driving conditions are conditions including printhead characteristics.

26. The apparatus according to claim 3, wherein said second management table holds as an index value a change in fundamental pulse width which is based on the number of simultaneously driven printing elements.

25 27. The apparatus according to claim 26, characterized by further comprising a fourth management table

*Sub A6*

representing a relationship between the change in fundamental pulse width and the index value, the fourth management table being prepared for each printing mode.

28. The apparatus according to claim 27, wherein the 5 printing mode is a mode for performing printing complementarily in accordance with a printing pass count.

29. The method for controlling a printing apparatus according to claim 12, wherein the fundamental pulse width is a fundamental pulse width selected and

10 determined from a plurality of fundamental pulse widths.

30. The method according to claim 12, wherein the driving conditions are conditions including printhead characteristics.

31. The method according to claim 14, wherein said 15 second management table holds as an index value a change in fundamental pulse width which is based on the number of simultaneously driven printing elements.

32. The method according to claim 30, characterized by further comprising a fourth management table representing a relationship between the change in fundamental pulse width and the index value, the fourth management table being prepared for each printing mode.

33. The method according to claim 32, wherein the 25 printing mode is a mode for performing printing complementarily in accordance with a printing pass count.